

State/Industry Ambient Monitoring Network

Air Quality Report

3rd Quarter 2000

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SECTION ONE

DISCUSSION OF MONITORING RESULTS

Sulfur Dioxide (SO₂)

There were no exceedances of the state or federal standards during the quarter. The maximum 1-hour concentration was 267 ppb on August 23 at Bear Paw #5; the maximum 3-hour concentration was 134 ppb on August 23 at Bear Paw #5; and, the maximum 24-hour concentration was 39 ppb on August 18 at DGC #16. All sites achieved at least an 80% data recovery for the period

Sulfur Dioxide (SO₂) 5-Minute Average

The maximum 5-minute concentration was 499 ppb on August 23 at Bear Paw #5.

Ozone (O₃)

There was no exceedance of the ozone standard during the quarter. The maximum observed 1-hour concentration was 72 ppb on July 29 at Fargo NW. The 4th highest 8-hour concentration was 61 ppb on August 24 at TRNP - SU. All sites achieved at least an 80% data recovery for the period operated except for Dunn Center.

Dunn Center failed to achieve 80% due to an analyzer failure.

Nitrogen Dioxide (NO₂)

The maximum 1-hour concentration observed was 65 ppb on September 17 at DGC #17. All sites achieved at least an 80% data recovery for the period operated except Hannover.

Hannover failed to achieve 80% data recovery do to an analyzer failure.

Inhalable Continuous PM_{2.5} Particulates

The continuous PM analyzer at Fargo NW was officially started on July 1. The maximum 1-hour concentration was 170.3 µg/m³ on July 4; the maximum 24-hour concentration was 21.8 µg/m³ on July 29. An 80% data recovery was achieved for the period operated.

Inhalable FRM PM_{2.5} Particulates

The maximum 24-hour average concentration was 37.7 $\mu\text{g}/\text{m}^3$ on August 24 at Sharon. All sites achieved at least an 80% data recovery for the period operated.

Inhalable PM₁₀ Particulates

There was no exceedance of the 24-hour standard during the quarter. The maximum 24-hour average concentration was 42.4 $\mu\text{g}/\text{m}^3$ on July 29 at Fargo NW. An 80% data recovery was achieved for the period operated.

Inhalable PM₁₀ Sulfates (SO₄)

The purpose for sulfate analysis is to aid the Department in assessing the impact of SO₂ emissions on inhalable particulate concentrations and visibility. The maximum 24-hour PM₁₀ sulfate concentration was 14.2 $\mu\text{g}/\text{m}^3$ on July 29 at Fargo NW. An 80% data recovery was achieved for the period operated.

PM₁₀ Sulfate/PM₁₀ Analysis

The PM₁₀ sulfate/PM₁₀ total mass tables present statistics for PM₁₀ sulfate and PM₁₀ total mass when both concentrations are greater than the respective minimum detectable concentration: 0.5 $\mu\text{g}/\text{m}^3$ for PM₁₀ sulfate analysis; 4 $\mu\text{g}/\text{m}^3$ for PM₁₀ total mass. Statistics for the ratio are produced by evaluating the ratio of the PM₁₀ sulfate concentration to the PM₁₀ total mass concentration for each data pair. In the individual summaries, one-half of the minimum detectable concentration is substituted for those concentrations less than the minimum detectable value. However, when the PM₁₀ total mass concentration is less than 4 $\mu\text{g}/\text{m}^3$, the PM₁₀ sulfate concentration can be higher than the PM₁₀ total mass concentration. This is because of the variability in the sulfate analysis procedure at low concentrations. Therefore, when calculating the ratio of PM₁₀ sulfate concentration to PM₁₀ total mass concentration, only data pairs where both the PM₁₀ sulfate and PM₁₀ total mass concentrations are greater than the minimum detectable concentrations are used. When the ratio is multiplied by 100, it becomes the percentage of total mass which is sulfate. The maximum 24-hr PM₁₀ Sulfate/PM₁₀ total mass ratio was 0.335 (33.5%) on July 29 at Fargo NW. The average ratio was 0.105 (10.5%) at Fargo NW.

SECTION TWO

AMBIENT AIR QUALITY DATA

SUMMARIES

COMPARISON OF AIR QUALITY DATA WITH
THE NORTH DAKOTA AMBIENT AIR QUALITY STANDARDS *

POLLUTANT : Sulfur Dioxide (ppb)

LOCATION	YEAR	SAMPLING PERIOD	NUM OBS	1 - HOUR		M A X I M A		24 - HOUR		ARITH MEAN	1HR #>273	24HR #>99	% >MDV
				1ST MM/DD/HH	2ND MM/DD/HH	1ST MM/DD/HH	2ND MM/DD/HH	1ST MM/DD	2ND MM/DD				
Amerada Hess - Tioga #1	2000	JUL-SEP	2185	16 09/12/02	16 09/17/12	9 09/08/17	8 09/12/02	4 09/08	3 09/12	1.3			10.2
Amerada Hess - Tioga #3	2000	JUL-SEP	2188	64 09/20/01	53 08/16/17	53 09/20/02	43 08/16/17	20 09/20	15 09/19	2.6			18.7
Bear Paw - MGP #3	2000	JUL-SEP	2179	40 09/07/03	37 09/06/13	26 08/28/14	24 09/06/14	7 08/28	5 09/06	1.2			5.6
Bear Paw - MGP #5	2000	JUL-SEP	2188	267 08/23/07	218 09/08/00	134 08/23/08	80 09/08/02	24 08/23	11 09/08	2.0			13.8
Beulah - North	2000	JUL-SEP	2194	159 08/27/11	64 08/22/12	74 08/27/11	49 08/22/14	14 08/27	8 08/22	2.6			31.8
DGC #12	2000	JUL-SEP	2193	74 08/21/13	57 08/27/09	50 08/21/14	27 08/21/11	13 08/21	8 08/24	2.5			26.5
DGC #14	2000	JUL-SEP	2192	65 08/21/09	56 08/24/15	41 08/24/17	31 08/09/14	11 08/21	9 08/24	2.0			16.1
DGC #16	2000	JUL-SEP	2172	127 08/18/22	118 08/18/12	90 08/18/14	90 08/18/23	39 08/18	13 08/19	4.5			57.5
DGC #17	2000	JUL-SEP	2194	120 08/18/18	110 08/27/01	65 08/18/20	64 08/20/08	16 08/09	14 08/14	4.1			53.4
Dunn Center	2000	JUL-SEP	2188	50 08/25/09	22 08/25/10	25 08/25/11	9 08/25/17	6 08/25	4 07/02	1.3			12.8
Fargo NW	2000	JUL-SEP	2198	4 08/29/20	2 07/04/21	2 08/04/05	2 08/29/20	1 07/01	1 09/30	1.0			0.3
Hannover	2000	JUL-SEP	2181	110 07/13/09	105 07/26/11	52 07/13/11	48 07/26/11	10 07/26	10 08/21	2.7			25.1
Mandan - SPM	2000	JUL-SEP	2192	95 09/20/04	93 09/06/17	66 09/06/17	65 09/20/05	31 09/20	20 08/28	3.4			24.4
Mandan NW - SPM	2000	JUL-SEP	2196	86 08/30/01	76 08/18/22	59 07/23/23	46 08/30/02	15 07/23	14 08/19	4.4			42.3

COMPARISON OF AIR QUALITY DATA WITH
THE NORTH DAKOTA AMBIENT AIR QUALITY STANDARDS *

POLLUTANT : SULFUR DIOXIDE (ppb)

LOCATION	YEAR	SAMPLING PERIOD	NUM OBS	1 - HOUR		M A X I M A		24 - HOUR		ARITH MEAN	1HR #>273	24HR #>99	% >MDV
				1ST MM/DD/HH	2ND MM/DD/HH	1ST MM/DD/HH	2ND MM/DD/HH	1ST MM/DD	2ND MM/DD				
Sharon	2000	JUL-SEP	2193	2 09/25/12	1 07/01/00	1 07/01/02	1 09/30/23	1 07/01	1 09/30	1.0			0.0
TRNP - SU (Painted Canyon)	2000	JUL-SEP	2194	10 08/01/06	10 08/25/02	6 08/01/08	6 08/25/02	2 07/08	2 09/13	1.1			4.7
White Shield	2000	JUL-SEP	2150	43 08/23/11	32 08/18/09	24 08/18/11	14 07/26/14	7 08/18	6 07/26	1.9			21.3

The maximum 1-hour concentration is 267 ppb at Bear Paw - MGP #5 on 08/23/07
The maximum 3-hour concentration is 134 ppb at Bear Paw - MGP #5 on 08/23/08
the maximum 24-hour concentration is 39 ppb at DGC #16 on 08/18

* The air quality standards are:

STATE Standards -

- 1) 273 ppb maximum 1-hour average concentration.
- 2) 99 ppb maximum 24-hour average concentration.
- 3) 23 ppb maximum annual arithmetic mean concentration.

FEDERAL Standards -

- 1) 500 ppb maximum 3-hour concentration not to be exceeded more than once per year.
- 2) 140 ppb maximum 24-hour concentration not to be exceeded more than once per year.
- 3) 30 ppb annual arithmetic mean.

COMPARISON OF AIR QUALITY DATA WITH
THE NORTH DAKOTA AMBIENT AIR QUALITY STANDARDS *

POLLUTANT : Sulfur Dioxide 5-Minute Averages (ppb)

LOCATION	YEAR	PERIOD	OBS	5 - M I N U T E M A X I M A						# HOURS >600	% >MDV
				1ST	DATE	2ND	DATE	3RD	DATE		
					MM/DD/HH		MM/DD/HH		MM/DD/HH		
Bear Paw - MGP #3	2000	JUL-SEP	2179	167	09/06/10	166	08/28/15	161	08/28/12	0	12.2
Bear Paw - MGP #5	2000	JUL-SEP	2188	499	08/23/08	494	09/07/23	437	08/23/07	0	26.3
Beulah - North	2000	JUL-SEP	2194	209	08/27/11	120	08/22/12	120	08/27/12	0	40.8
Dunn Center	2000	JUL-SEP	2057	70	08/25/09	68	08/25/10	44	07/05/17	0	20.6
Fargo NW	2000	JUL-SEP	2198	4	08/29/20	2	07/04/21	2	08/04/04	0	0.3
Hannover	2000	JUL-SEP	2181	164	07/13/09	131	07/26/11	124	08/21/09	0	35.3
Mandan - SPM	2000	JUL-SEP	2192	177	09/06/17	153	08/28/12	133	09/20/16	0	34.4
Mandan NW - SPM	2000	JUL-SEP	2196	157	08/23/09	126	08/30/01	125	08/24/11	0	54.7
Sharon	2000	JUL-SEP	2193	2	09/25/12	1	08/29/09	1	09/12/16	0	0.0
TRNP - SU (Painted Canyon)	2000	JUL-SEP	2194	10	08/01/06	10	08/25/02	8	07/07/23	0	4.7

The maximum 5-minute concentration is 499 ppb at Bear Paw - MGP #5 on 08/23/08

* No Standard is currently in effect:

COMPARISON OF AIR QUALITY DATA WITH
THE NORTH DAKOTA AMBIENT AIR QUALITY STANDARDS *

POLLUTANT : Ozone (PPB)

LOCATION	YEAR	SAMPLING PERIOD	NUM OBS	1 - HOUR		M A X I M A		8 - HOUR		4TH	1HR #>120	8HR #>80
				1ST MM/DD/HH	2ND MM/DD/HH	1ST MM/DD/HH	2ND MM/DD/HH	3RD MM/DD/HH	4TH MM/DD/HH			
Beulah - North	2000	JUL-SEP	2194	60 08/11/12	57 09/08/15	51 08/26/12	50 08/11/10	50 08/11/09	50 08/26/13			
Dunn Center	2000	JUL-SEP	607 ***	71 09/17/16	62 09/17/15	55 09/08/10	46 09/17/10	46 09/17/09	46 09/17/08			
Fargo NW	2000	JUL-SEP	2194	72 07/29/11	72 07/29/12	69 07/29/08	56 07/29/10	56 07/29/09	56 07/29/07			
Hannover	2000	JUL-SEP	2181	62 08/11/15	61 08/11/14	56 08/11/10	50 08/11/09	50 08/11/11	50 08/11/08			
Sharon	2000	JUL-SEP	2193	59 07/29/15	58 07/29/14	56 07/29/09	52 07/29/10	52 07/29/08	52 07/29/11			
TRNP - SU (Painted Canyon)	2000	JUL-SEP	2196	66 09/17/14	65 07/01/12	62 07/01/08	61 07/01/07	61 08/24/10	61 08/24/09			

The maximum 1-hour concentration is 72 ppb at Fargo NW on 07/29/11

The 4th highest 8-hour concentration is 61 ppb at TRNP - SU (Painted Canyon) on 08/24/09

* The air quality standards for ozone are:

STATE - 120 ppb not to be exceeded more than once per year.

FEDERAL - Fourth highest daily maximum 8-hour averages for a 3-year period not to exceed 80 ppb.

*** Less than 80% of the possible samples (data) were collected.

COMPARISON OF AIR QUALITY DATA WITH
THE NORTH DAKOTA AMBIENT AIR QUALITY STANDARDS *

POLLUTANT : Nitrogen Dioxide (ppb)

LOCATION	YEAR	SAMPLING PERIOD	NUM OBS	M A X I M A 1 - HOUR		ARITH MEAN	% >MDV
				1ST MM/DD/HH	2ND MM/DD/HH		
Beulah - North	2000	JUL-SEP	2191	29 09/12/19	26 09/13/22	3.3	76.6
DGC #12	2000	JUL-SEP	2175	36 09/12/19	35 09/12/20	3.4	81.8
DGC #17	2000	JUL-SEP	2129	65 09/17/01	48 09/17/00	4.9	98.4
Dunn Center	2000	JUL-SEP	2182	12 08/25/09	11 09/03/05	2.5	69.8
Fargo NW	2000	JUL-SEP	2191	41 09/28/18	37 07/28/21	5.1	79.6
Hannover	2000	JUL-SEP	1026 ***	30 07/26/11	25 07/13/09	2.4	48.5
Sharon	2000	JUL-SEP	2192	16 08/15/20	12 08/15/21	1.4	25.8

The maximum 1-hour concentration is 65 ppb at DGC #17 on 09/17/01

* The air quality standards are:
STATE - 53 ppb maximum annual arithmetic mean.

FEDERAL - 53 ppb annual arithmetic mean.

*** Less than 80% of the possible samples (data) were collected.

COMPARISON OF AIR QUALITY DATA WITH
THE NORTH DAKOTA AMBIENT AIR QUALITY STANDARDS *

POLLUTANT : Inhalable Continuous PM_{2.5} (µg/m³)

LOCATION	YEAR	SAMPLING PERIOD	NUM OBS	1 - HOUR		M A X I M A		24 - HOUR		MEAN	1HR #>150	24HR #>65
				1ST MM/DD/HH	2ND MM/DD/HH	1ST MM/DD	2ND MM/DD	3RD MM/DD	4TH MM/DD			
Fargo NW	2000	JUL-SEP	2201	170.3 07/04/21	72.6 09/29/19	21.8 07/29	19.8 07/30	15.9 08/02	15.4 07/04	6.3	1	

The maximum 1-hour concentration is 170.3 µg/m³ at Fargo NW on 07/04/21
The highest 24-hour concentration is 21.8 µg/m³ at Fargo NW on 07/29

* The ambient air quality standards are:

FEDERAL Standards -

- 1) 24-hour: 3-year average of 98th percentiles not to exceed 65 µg/m³.
- 2) Annual: 3-year average not to exceed 15 µg/m³.

COMPARISON OF AIR QUALITY DATA WITH
THE NORTH DAKOTA AMBIENT AIR QUALITY STANDARDS *

POLLUTANT : Inhalable FRM PM_{2.5} Particulates (µg/m³)

					M A X I M A 24 - HOUR						
LOCATION	YEAR	SAMPLING PERIOD	NUM OBS	MIN	1ST MM/DD	2ND MM/DD	3RD MM/DD	ARITH MEAN	#> 65	AM>15	% >MDV
Beulah - North	2000	JUL-SEP	15	2.8	14.0 08/04	9.8 07/29	9.4 08/10	6.7			100.0
Bismarck Residential	2000	JUL-SEP	31	2.1	14.5 08/25	14.3 08/04	12.1 07/29	6.7			100.0
Dickinson Residential	2000	JUL-SEP	14	1.9	12.3 08/04	8.8 08/10	8.4 08/28	6.0			92.8
Fargo NW	2000	JUL-SEP	31	2.0	26.4 07/29	19.0 08/28	13.7 08/25	8.2			100.0
Grand Forks - North	2000	JUL-SEP	30	1.6	24.6 07/29	17.4 09/27	15.8 08/10	8.3			93.3
Sharon	2000	JUL-SEP	15	0.4	37.7 08/24	21.0 07/29	12.5 08/04	9.4			93.3
TRNP - SU (Painted Canyon)	2000	JUL-SEP	12	2.0	12.0 08/04	9.8 08/10	9.1 07/23	6.9			100.0

The maximum 24-hour concentration is 37.7 µg/m³ at Sharon on 08/24

* The ambient air quality standards are:

FEDERAL Standards -

- 1) 24-hour: 3-year average of 98th percentiles not to exceed 65 µg/m³.
- 2) Annual: 3-year average not to exceed 15 µg/m³.

COMPARISON OF AIR QUALITY DATA WITH
THE NORTH DAKOTA AMBIENT AIR QUALITY STANDARDS *

POLLUTANT : Inhalable PM₁₀ Particulates (µg/m³)

LOCATION	YEAR	SAMPLING PERIOD	NUM OBS	MIN	M A X I M A 24 - HOUR			ARITH MEAN	#>150	AM>50	% >MDV
					1ST MM/DD	2ND MM/DD	3RD MM/DD				
Dragswolf	2000	JUL-SEP	15	3.5	17.2 08/22	10.8 09/03	8.8 08/04	7.7			93.3
Fargo NW	2000	JUL-SEP	13	12	42.4 07/29	36.4 08/04	35.3 08/28	23.9			100.0
White Shield	2000	JUL-SEP	15	3.9	20.1 08/04	20.1 08/10	16.4 07/29	11.5			93.3

The maximum 24-hour concentration is 42.4 µg/m³ at Fargo NW on 07/29

* The STATE and FEDERAL air quality standards are:

- 1) 150 µg/m³ maximum averaged over a 24-hour period with no more than one expected exceedance per year.
- 2) 50 µg/m³ expected annual arithmetic mean.

COMPARISON OF AIR QUALITY DATA WITH
THE NORTH DAKOTA AMBIENT AIR QUALITY STANDARDS *

POLLUTANT : Inhalable PM₁₀ Sulfates (µg/m³)

LOCATION	YEAR	SAMPLING PERIOD	NUM OBS	MIN	M A X I M A 24 - HOUR			ARITH MEAN	#>15.	AM>5.	% >MDV
					1ST MM/DD	2ND MM/DD	3RD MM/DD				
Fargo NW	2000	JUL-SEP	13	0.3	14.2 07/29	7.9 08/28	3.8 08/04	2.4			69.2

The maximum 24-hour concentration is 14.2 µg/m³ at Fargo NW on 07/29

* No standard is currently in effect.

COMPARISON OF AIR QUALITY DATA WITH
THE NORTH DAKOTA AMBIENT AIR QUALITY STANDARDS *

POLLUTANT : PM₁₀ Sulfate/PM₁₀ Total Mass Ratio (Percentage)

LOCATION	YEAR	SAMPLING PERIOD	NUM		M A X I M A			ARITH MEAN
			OBS	MIN	1ST MM/DD	2ND MM/DD	3RD MM/DD	
Fargo NW	2000	JUL-SEP	9	2.9	33.5 07/29	22.4 08/28	10.4 08/04	10.5

The maximum 24-hour ratio is 33.5 percent at Fargo NW on 07/29

* No standard is currently in effect.

SECTION THREE

EXCEEDANCE LISTINGS

By Site Date Hour

All Units Are in Parts Per Billion Except Wind Direction (Degrees),
Wind Speed (MPH), CO (PPM), and PM_{2.5} and PM₁₀ (µg/m³)

The * Identifies the Exceedances

NONE

By Date Hour Site

All Units Are in Parts Per Billion Except Wind Direction (Degrees),
Wind Speed (MPH), CO (PPM), and PM_{2.5} and PM₁₀ (µg/m³)

The * Identifies the Exceedances

NONE